USAWC STRATEGY RESEARCH PROJECT

NATIONAL STRATEGY AND IMPLEMENTATION OF THE NEW TRIAD – CONGRUENT OR DIVERGENT?

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ABSTRACT

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TITLE: National Strategy and Implementation of the New Triad – Congruent or Divergent?

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The most recent Nuclear Posture Review (NPR) was published in 2001. It outlined a New Triad that included offensive strike systems (nuclear and non-nuclear), defenses (active and passive), and a defense infrastructure (providing new capabilities that quickly meet emerging threats) bound together by enhanced command, control, and intelligence systems. While the 2001 NPR represents a significant shift in traditional strategic deterrence thinking through reduced dependency on nuclear weapons, it is not clear that the current glide path for implementation of the resultant Triad in 2012 will support post-9/11 US security strategy. For example, it is unclear whether the resultant Triad will possess sufficient capabilities to meet challenges such as WMD proliferation, increased enemy use of deeply buried critical facilities, and enemy awareness of US concern for collateral damage. This project examines current national and military strategy and expected Triad capabilities. It then evaluates these capabilities in light of political, legislative, budgetary, and planning realities during the implementation period of the current NPR. This project pays particular attention to the offensive nuclear and conventional strike leg of the Triad to determine if the path for support of national security strategy is congruent or divergent.

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NATIONAL STRATEGY AND IMPLEMENTATION OF THE NEW TRIAD – CONGRUENT OR DIVERGENT?

At first blush the capabilities of the New Triad outlined in the 2001 Nuclear Posture Review (NPR) seem to resonate with post-9/11 national and military strategic documents. In those documents, senior leaders call for new capabilities and innovative ways to deter and defeat enemies of the United States, and the NPR essentially revamped the former nuclear Triad in order to provide these new capabilities.

However, it is not clear that the United States can achieve them in the timeframe described (i.e., by 2012). While there is little debate that the traditional nuclear Triad, and, perhaps the nature of deterrence, required major overhaul following the end of the Cold War and the terrorist attacks of 2001, it is also not clear that the major changes described by the NPR will achieve the desired effects against threats in the 21st century. The DoD implementation plan for the NPR, published in 2003, describes specific tasks, timelines, and responsibilities in order to achieve adequate operational capability for the New Triad. Overall operational numbers of nuclear weapons will be reduced, and advanced conventional weapons fielded in order to supplement or, in certain circumstances, replace them. While this concept sounds reasonable, the debate on how best to achieve success, or whether success is even achievable, is still ongoing. For example, precision-guided, variable-yield, earth-penetrating nuclear weapons are absent in the nuclear stockpile, but the implementation plan only calls for study of earth penetrating nuclear weapons.

Further improvements to nuclear weapons may be required to address military and political realities such as increased concern for the consequences of offensive strikes on non-combatants, WMD proliferation, and use of hard and deeply buried targets (HDBTs) by enemy combatants. Not surprisingly, however, introduction of new nuclear weapons or improved capabilities for existing ones evokes strong reactions from arms control advocates, anti-nuclear scientists and activists, as well as proponents of current administration policies. Likewise, the capabilities expected by fielding advanced conventional weapons might not be sufficient. Advanced conventional weapon development comes with certain inherent risk when one considers the science and technology challenges – not to mention programmatic ones – in order to achieve operational deployment.

This paper will evaluate whether the current implementation of the NPR through 2012 results in a congruent or divergent path of support for national security strategy. This evaluation and analysis will be accomplished through examination of the nuclear and deterrence landscape following the Cold War, the view through the lenses of current national and military strategic

documents (particularly as they relate to the nuclear and non-nuclear strike leg of the New Triad), arguments for and against new nuclear weapons, and the challenges facing advanced conventional capabilities.

POST COLD WAR NUCLEAR STAGE

The end of the Cold War left the United States with a nuclear stockpile of over 25,000 warheads, but a less clear threat to apply the calculus of deterrence.[1] US policy grew from the relatively simple algebraic logic of massive retaliation during the Eisenhower administration, a flexible response policy in the 1960s, a more complex countervailing strategy in response in improvement in Soviet capabilities in the 1970's, and significant modernization of nuclear forces to encourage peace through strength in the 1980's.[2]

The nuclear stockpile at the end of the Cold War consisted of nuclear weapons ranging from cruise missiles and gravity bombs to reentry vehicles (RVs) and reentry bodies (RBs). These generally fell into two categories: strategic (primarily RVs, RBs, and certain thermonuclear bombs) and tactical (generally shorter range, lower yield weapons). A Triad of strategic delivery systems consisting of bombers, intercontinental ballistic missiles (ICBMs), and submarine launched ballistic missiles (SLBMs) could carry the weapons to their targets. This Triad, fundamentally unchanged since the 1960s, was designed to provide maximum probability for nuclear force survival in the event of nuclear attack and was the centerpiece of US strategic deterrence strategy and policy. The end of American/Soviet confrontation led quickly to several nuclear initiatives responding to the rapidly changing threat landscape.

Presidential Nuclear Initiatives (PNIs), introduced in 1991, eliminated all ground launched tactical nuclear weapons from the inventory, and removed all nuclear weapons from aboard naval vessels (except SSBNs) and ground bases. PNIs also took nuclear capable aircraft and ICBMs (those scheduled for deactivation) off alert.[3] The United States unilaterally stopped underground tests (UGTs) of nuclear weapons in 1992 in recognition of the changing world environment. Additionally, the United States signed the second Strategic Arms Reduction Treaty (START II) with Russia in 1993 further reducing the number of strategic warheads and the systems carrying them.[4] A result of these sweeping and remarkable initiatives solidified the movement of US strategy away from Cold War predominant reliance on nuclear forces to deter against nuclear attack and to counterbalance Soviet conventional forces in Eastern Europe to a broader position that nuclear forces were necessary to deter against the use of weapons of mass destruction (WMD) by non-peer adversaries, and to serve as a hedge against the emergence of an overwhelming and unanticipated conventional threat.[5]

These initiatives led to a policy of "Lead" (unilateral reductions in numbers as necessary) and "Hedge" (guard against the possibility of a reemergence of a Soviet-like threat with a large stockpile of nuclear arms). The elimination of the 50+ year legacy of testing weapons by detonation in relatively costly UGTs led to the Stockpile Stewardship Program (SSP) administered by the Department of Energy (DOE). Historically, DOE has been responsible for development and maintenance for the nuclear warheads or "physics packages" while DoD has been responsible for determining requirements for warheads and development and maintenance of delivery systems. Notably, DOE created the National Nuclear Security Administration (NNSA) in the late 1990's to assume responsibility for nuclear weapons programs and to help improve management oversight. By 2000 the United States had significantly reduced the number of weapons in its nuclear stockpile and demonstrated resolve to reduce further its reliance on nuclear weapons for strategic deterrence. Interestingly, these reductions were accomplished without the formal arms control processes so familiar (and crucial considering the US/USSR relationship) during the Cold War. Demonstrations of this resolve could also be found in the continuance of the UGT moratorium despite US non-ratification of the Comprehensive Test Ban Treaty (CTBT) in 1996, the lack of new nuclear weapons development beyond a penetration modification of the B-61 gravity bomb, and the focus on improving technological advantages, projection, and make-up of US conventional forces.

These remarkable and sweeping changes made throughout the 1990's were not without a price. Focus on emerging state and non-state threats, significant reductions in conventional force structure, and the search for elusive "peace dividends" to fund conventional technological pursuits after the first Gulf War led to a natural de-emphasis of almost all things "nuclear." Funding for nuclear programs (beyond the SSP) declined, infrastructure deteriorated,[6] and the resultant stockpile in 2000 consisted of weapons developed during the Cold War. This is not to say that nuclear weapons were completely ignored during the previous decade. Personnel within the nuclear community grappled with the rapid change in international and political landscape and attempted to develop and recommend appropriate levels and scope of nuclear management, planning, and policy. It is probably fair to say, however, that their priorities were not congruent with those of high level defense policy-makers.

POST 9/11 NATIONAL AND MILITARY STRATEGIC DOCUMENTS

Following the terrorist attacks on 11 September 2001, publication of national and military strategic documents established ends, ways, and to a certain degree, the means for strategic concepts involving nuclear weapons and the notion of deterrence in the new millennium.

NUCLEAR POSTURE REVIEW

On 31 December 2001, DoD submitted a report as well as presented a series of briefings to Congress on the NPR. It proposed a New Triad consisting of: offensive nuclear and non-nuclear strike systems; active and passive defenses; and a revitalized defense infrastructure to provide new capabilities to meet emerging threats (Figure 1). For the first leg, the concept was not to replace ICBMs, SLBMs, or long range bombers, but to supplement their nuclear

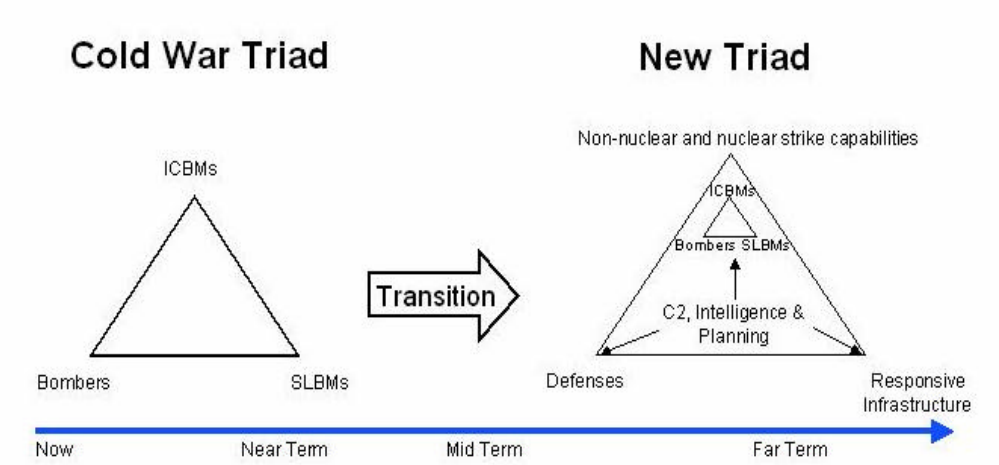

FIGURE 1. NEW TRIAD[7]

capabilities with non-nuclear ones, thereby increasing offensive effectiveness and credibility. The second leg appeared to be an acknowledgement that the ability to strike enemies with the spectrum of offensive capabilities was not in itself sufficient to deter them. In this case the United States would need both active (find and defeat) and passive (respond to) defenses. The defenses and improved capability to respond would add to the deterrence equation by discouraging attacks. The third leg of responsive infrastructure is a response to significant defense military downsizing in the previous decade and the corresponding atrophy of the nuclear infrastructure.[8] The complex infrastructure that designed and fielded exquisite nuclear weapons (from a scientific and engineering point of view) during the Cold War can no longer respond quickly to a request to build and field new nuclear capabilities. A solid infrastructure is required to reduce the size of the nuclear stockpile because weapons dismantlement is a complex, laborious, and expensive process.[9] In summary, the NPR drew upon the QDR, but also presented a way to achieve the ends described in documents that were to follow. It sought

to modify a system of deterrence designed for the Cold War, but not to abandon nuclear weapons altogether.

QUADRENNIAL DEFENSE REVIEW

The Quadrennial Defense Review (QDR), published in September 2001, explicitly stated four defense policy goals (the "ends" essentially restated in subsequent documents) to assure, dissuade, deter threats and coercion, and – if deterrence fails – decisively defeat the enemy. First, nuclear weapons have played a part in all four ends in the past traditionally by first assuring allies without nuclear weapons that they fell under the US nuclear umbrella. Second, our economic and scientific capabilities to rebuild a nuclear arsenal if necessary serve to dissuade others who may hope to rise as a peer competitor. Third, US nuclear capabilities have served as a successful deterrent for nearly 60 years. Finally, should deterrence fail, nuclear weapons serve as an ultimate "trump card" to defeat an enemy determined to use chemical, biological, or nuclear weapons. The question remains whether the current stockpile still supports these ends after 2001. The QDR also emphasized movement to a capabilities-based force able to defeat adversaries relying on deception and asymmetry. It recognized that transformation was critical to strategic success, and that continuing "business as usual" within the Department was not a viable option. This transformation included denying the enemy sanctuary through improved surveillance and rapid precision strike.[10]

NATIONAL SECURITY STRATEGY

The National Security Strategy (NSS), published in September 2002, obliquely mentioned nuclear weapons as an effective Cold War deterrence tool and acknowledged that the United States and Russia had reduced nuclear stockpiles. However, there were other areas in the document that resonated within the nuclear community. After restating enduring American values and goals, the NSS pointed out the desire to "prevent our enemies from threatening us, our allies, and our friends, with weapons of mass destruction" and to "transform America's national security institutions to meet the challenges and opportunities of the twenty-first century." If necessary, these requirements could be carried out through preemptive strikes against rogue states and terrorists. This is an important point in that the NSS explicitly points out that the United States can no longer count on traditional means (nuclear weapons) to deter an attacker bent on using WMD as an asymmetric means. The President therefore needs a broader range of military options to meet these threats.[11]

TRANSFORMATION PLANNING GUIDANCE

The Transformation Planning Guidance (TPG), published in April 2003, leveraged the QDR transformation goals (including the requirement to deny enemy "sanctuary") and reemphasized the push from requirements-based systems to capabilities-based for force development, identification processes, and strategic planning. It also recognized risk management as one of the tenets of defense strategy.[12] This concept is germane to the offensive strike leg of the New Triad since the required transformation incurs a certain level of operational and institutional risk. For example, where nuclear operational numbers are drawn down, the United States accepts increased risk for possible reemergence of a nuclear-armed, near-peer, and hostile adversary. The United States is also accepting risk in advanced conventional weapon development if one presumes that currently planned expenditures will yield sufficient non-nuclear capabilities as called for in the NPR.

CHANGE TO THE UNIFIED COMMAND PLAN OF 2002

On 10 January 2003, President Bush signed a second change to the Unified Command Plan of 2002 (UCP c/2). This marked a significant step in laying responsibility and providing the "means" for executing the business end of the New Triad. The United States Strategic Command (USSTRATCOM), the military professionals traditionally responsible for executing the unthinkable (possible thermonuclear war), were assigned additional responsibility for Global Strike (GS), Integrated Missile Defense, DoD Information Operations, Command Control Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) missions, and additional space responsibilities (the US space command no longer existed).[13] For the purposes of this discussion, the GS role is significant. This represents planning and execution of theater nuclear or non-nuclear strikes conducted anywhere, anytime, with precision, accuracy, speed, and required lethality. It required a major reorganization of not only personnel and structure in the command, but also a significant change in adaptive planning, thinking, and interfacing with other combatant commands. The selection of a Marine general officer to fill a traditionally Navy or Air Force combatant command position was perhaps indicative of SECDEF expectations for major change at USSTRATCOM.

MILITARY STRATEGY AND NATIONAL DEFENSE STRATEGY

The National Military Strategy (NMS), published in 2004, offered ways and means by which the CJCS would support the NSS ends, as well as those of the National Defense Strategy (NDS) to be published in 2004. The NMS reflected portions of the NPR in that nuclear weapons were noted for continuing to provide an important deterrence role; however, the New Triad

provided a strategic deterrence capitalizing on non-nuclear strike capabilities as well. The end result was described as a "diverse portfolio of capabilities" to deter a wide range of adversaries.[14]

JOINT OPERATING CONCEPT FOR STRATEGIC DETERRENCE

The NMS also introduced the Joint Operating Concept (JOC) for Strategic Deterrence. This publication, one of four subsets of the Joint Operations Concept, has a role in developing the capabilities-based systems outlined in the QDR, NDS, and NMS. It described nuclear capabilities required to bolster future US deterrence. These included a nuclear strike capability that can threaten HDBTs, limit collateral damage, deny sanctuary; and increase credibility of nuclear threats – regardless of whether these threats are ambiguous or unambiguous. This JOC also called for a revitalization of the nuclear infrastructure to achieve this capability. [15] This is in recognition that building a comprehensive nuclear capability to threaten, limit, deny, and increase credibility is problematic given the current state of the nuclear weapon program infrastructure. At a minimum, it would take a considerable period of time and fiscal resources for NNSA to design and field a new weapon given the rigid nuclear weapon developmental process and legal constraints.

NUCLEAR POSTURE REVIEW IMPLEMENTER

The classified NPR implementer, published March 2003, presents ways to achieve the ends described in the NPR. The time to its publication, nearly 18 months after the NPR, is perhaps indicative of the challenges faced by OSD to achieve the overall objectives for the New Triad. Internal OSD debate over ownership of the implementation process between the offices of the Undersecretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) and the Undersecretary of Defense for Policy (USD(P)) seemed to slow publication.[16] Interestingly NNSA published its respective implementer in early spring of 2002; presumably to "lean forward" and tackle the difficult tasks of managing a rapidly changing stockpile, infrastructure improvements, and the movement and security of weapons.

The NPR implementer is generally directive in nature. It describes the elimination and modification of specific weapon system(s) in order to achieve 1700 - 2200 operationally deployed nuclear warheads, as well as the fielded capabilities required to achieve a viable New Triad (Figure 2).

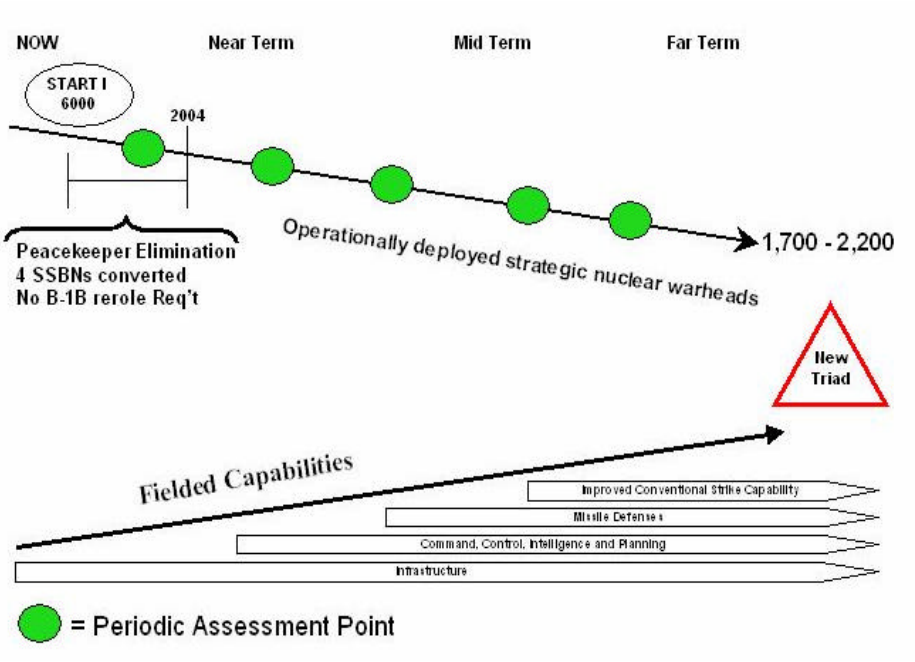

FIGURE 2. GLIDE PATH FOR IMPLEMENTATION [17]

Unclassified portions direct USD(P) and USD(AT&L) to develop strategic plans for the New Triad, develop conventional and nuclear metrics to quantify effectiveness of integrated strike plans, develop a plan to correct limitations in nuclear effects modeling, implement recommendations from the Defense Science Board study on HDBTs, assist the Nuclear Weapons Counsel to provide effective review of NNSA programs as they relate to OSD requirements for the New Triad, conduct periodic reviews for infrastructure adequacy, conduct studies to ensure strategic platforms and appropriate weapons are developed for the 20+ year future, and call for a DSB study to forecast required DoD skills.[18] USD(P), in coordination with multiple DoD, OSD, and USG partners, are to conduct periodic reviews (vetted through a senior steering group) in order to evaluate risks, review programs, assess the strategic environment, and identify gaps between capabilities required and those expected of the New Triad.[19]

DOCUMENT SUMMARY

A common thread woven through the fabric of current national and military strategic documents is a call for increased capabilities to adapt to a changing world. In this context, the NPR and its implementor clearly call for new capabilities to support decision makers. Another thread calls for transformation, and certainly no one questions the fundamental transformation represented by the New Triad. In short, the way presented by the NPR and its implementer are supportive of the ends established by the NSS, NMS, and QDR, but one might question whether the means to achieve these ends have been identified as clearly. One example may be whether the Services have been sufficiently resourced (and overseen) to field advanced conventional weapons and platforms to replace some capabilities previously provided by nuclear weapons. It is also not clear that there is sufficient risk mitigation in the event these advanced weapons are not forthcoming, or that the idea of modifying or transforming nuclear weapons (vice simply drawing down numbers) has been thoroughly examined in order to provide such mitigation.

NUCLEAR AND CONVENTIONAL CAPABILITY GAP

The United States most likely will achieve1700-2200 operational nuclear warheads by 2012. However, the intelligence community recognizes that enemies (current or potential) are increasing their capabilities to threaten the United States or deny/disrupt our ability to deal with those threats – even with nuclear weapons. For example, Russia, China, North Korea, and Iran continue development and modernization of their respective intermediate and long-range ballistic missile systems. The problems associated with attacking deeply buried and hardened facilities are acute, and the numbers in North Korea alone are staggering (in the thousands if one includes tunnels for long range artillery). Additionally, the depth and distribution of these HBDTs is disconcerting (Figure 3). The DIA Director stated in testimony to the Senate in February 2004 that: "Use of underground facilities (UGFs) to protect and conceal WMD, ballistic missiles, leadership, and other activities are expanding. Growing numbers of UGFs are especially notable among nations with WMD programs. In 2003, we have observed more than a dozen new military or regime-related UGFs under construction."[20] Additionally, is not clear whether advanced conventional weapons can adequately deal with these increased threats in light of reduced numbers of nuclear weapons. More importantly, it is unclear whether the NPR and implementer ensure sufficient RDT&E funding by the Services and combat support agencies to develop, test, and field these advanced conventional weapons. Adequate funding is required to help mitigate the mid and long term risk associated with reduced numbers of

operational nuclear weapons at the same time the stockpile, its associated infrastructure, and personnel expertise continue to age. In order to assess this issue, one must first understand

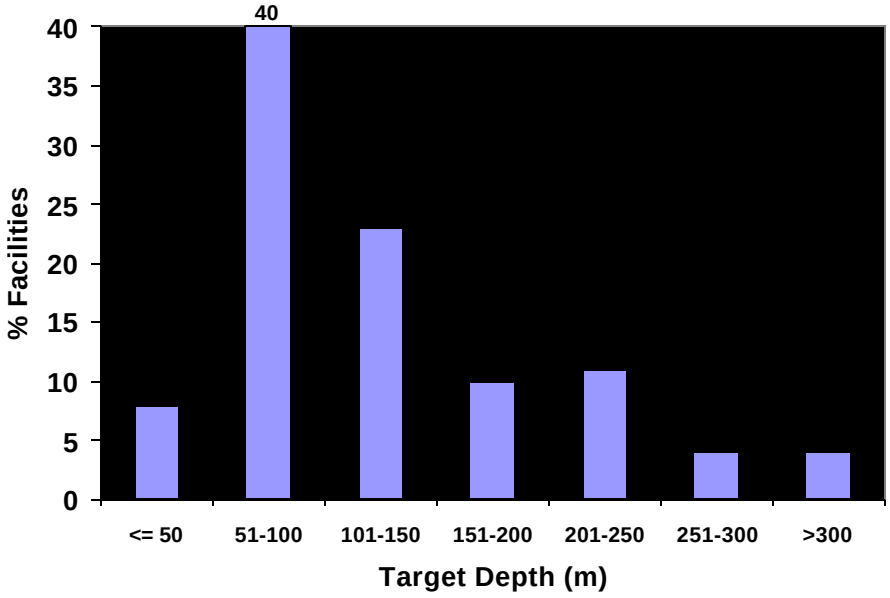

FIGURE 3. POSTULATED HDBT DEPTHS[21]

what constitutes the "gap" of capability shortfalls between nuclear and conventional weapons.

WEAPON LETHALITY

Current penetrating weapons such as the BLU-109 and BLU-113 are extremely effective against hardened yet shallow bunkers, but have limited capabilities against tunnel facilities unless "skipped" into the entrance or sequenced against the same aim-point (Figure 4). Unfortunately, there are significant limitations to the actual effects or lethality of these weapons against UGFs. Portal attack effectiveness is a function of precise location of the UGF's entrance(s) and duration of enemy capability to clear the debris. Multiple and sequential strikes (aptly called "divine miracles") in the same entry point of the previous weapon are problematic due to the required precision and accuracy. Skipping weapons into portal entrances have yielded spectacular film footage, but flight tactics required to execute such an attack under combat conditions against enemy air defenses are questionable.

Nuclear weapons have a unique capability to deliver damage to deep targets through the multiple effects of coupling the blast effects with the ground – thereby creating shock waves that essentially crush the tunnel facility. However, even nuclear weapons have limitations in relation to target destruction effectiveness at great depths. The weapon must survive the penetration of existing soil or rock conditions in order to achieve coupling sufficient to crush the facility and, of course, the yield of the weapon must be sufficient as well.

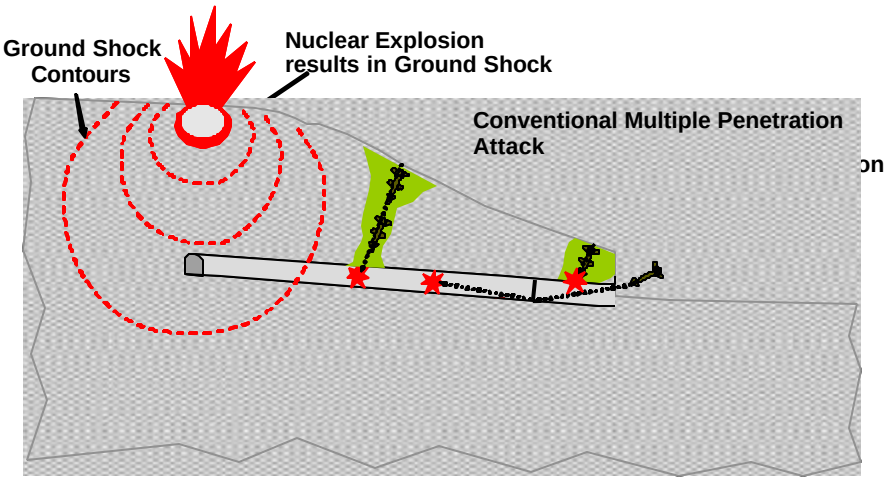

FIGURE 4. CONVENTIONAL AND NUCLEAR DAMAGE MECHANISMS [22]

DELIVERY TIME

Current families of conventional penetration weapons must overcome a particularly difficult lethality equation in order to be considered a viable strike option. In general, heavy weapons equate to longer delivery times. Theater based cruise missiles and UAVs can be launched relatively quickly, but lack the destructive explosive power to threaten UGFs. Relatively massive bombs carry larger explosive packages, but must be carried by bombers requiring longer generation times (Figure 5) if launched from CONUS. Similarly, more weight or sheer mass added to a weapon to increase its penetrative capability will reduce the amount of explosives it can carry. One may be able to create a weapon that can penetrate to impressive depths, but, if it only carries a several kilogram explosive package its military usefulness may be negligible. Additionally, there is an upper limit to the weight carrying capacity for a heavy bomber. Weapons with sufficient weight and explosive capacity to threaten certain categories

of HBDTs may only be singly loaded – again limiting bomber effectiveness if sortie rates are of concern.

Finally, some have advocated capitalizing on the relatively simple physics equation of $KE = \frac{1}{2} MV^2$ (KE = kinetic energy; M = Mass; V = velocity) in order to harness the energy and rapid delivery times offered by SLBM, ICBM, or short range missile delivered conventional or inert warheads – in the same way sabot tank rounds destroy their intended targets. While this concept is viable, its effectiveness is limited against deeply buried targets due to rapid energy

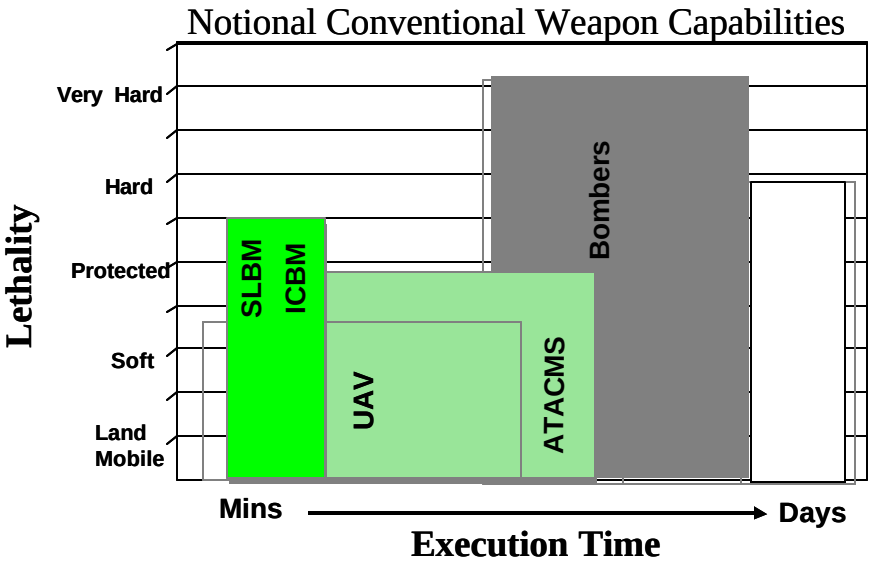

FIGURE 5. LETHALITY VERSUS TIMELINE[23]

dissipation at the earth's surface. This loss of effectiveness is the same for nuclear surface or above ground detonations against HDBTs. Additionally, nuclear weapons are not constrained by "lethality-to-weight" issues, but lengthy generation times for weapons other than alerted SLBMs and ICBMs are problematic for planners if rapid attack timelines are required.

CONSEQUENCES OF EXECUTION

Where nuclear weapons excel in lethality versus weight compared to conventional weapons, they do not measure up favorably for consequences of execution (COE). Precision conventional weapons have demonstrated their potential to mitigate collateral damage in urban environments. Heavier weapons or multiple strikes against deeply buried facilities would

certainly be viewed favorably in most high valued target equations unless inadvertent release of stored WMD material was a consideration. In so far as nuclear weapons are concerned, low altitude bursts against above-ground targets are extremely effective in achieving high probabilities for effective military damage with low fallout effects, but the damage in an urban environment (though localized to the target area at lower yields) may be considered too indiscriminant by today's international standards. Deeply buried targets are vulnerable to the current inventory of weapons, but surface or below surface bursts and high yields necessary to achieve desired effects are problematic. The radiological fallout subsequent to a high yield surface or below surface nuclear burst would be significant politically, if not militarily.

FUTURE WEAPON DEVELOPMENT

Current conventional weapons, though impressive in their own right, do not yet bridge the gap in capability when compared to nuclear weapons. However, there have been considerable improvements to existing weapon systems, making them more effective through increased penetration and/or damage mechanisms. Examples include Thermobaric (TB) Hellfire, TB and "agent defeat" BLU-109 variants, as well as penetration variants of cruise missiles.[24] They have demonstrated potential for further development, but do not in themselves represent the type of increased capabilities needed by the New Triad. New weapons with deeper penetrative capability, greater speed, and varied delivery options are required. If this is true, then what weapons in development could augment the offensive strike leg of the Triad by 2012? The following weapons could be operational in the 2012 timeframe, but are not necessarily a comprehensive listing of all systems in development due to classification issues. None, however, beyond a proposed nuclear penetrator, will defeat deeper UGFs.

Massive Ordinance Penetrator

The Massive Ordinance Penetrator (MOP) would be an extremely large cousin to the existing family of precision-guided heavy bombs. It is an intriguing yet relatively unimaginative approach to the problem of penetrating through difficult soil and rock conditions. Intriguing because of its sheer size; unimaginative because it adheres to the mindset of bigger = better. The MOP, if fielded, would weigh nearly 14 tons with approximately three tons of high explosive. Its potential penetrative capability could threaten tunnels at depths greater than 100 feet (Figure 6). More importantly, its design may provide sufficient flexibility to add other payloads (nuclear or agent defeat) in order to achieve desired effects.[25]

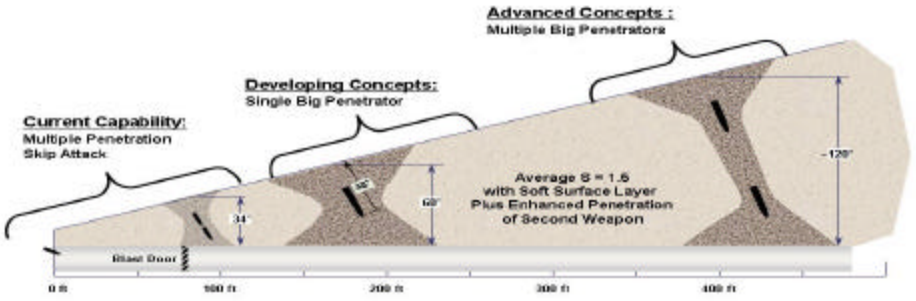

FIGURE 6. MOP POTENTIAL [26]

Hypersonic Strike Weapon

The Navy is currently testing a hypersonic strike (HyStrike) weapon designed to travel at velocities greater than Mach 4. The technologies advanced by this design will allow for increased responsiveness due to its speed and approximately 700 mile range. It would threaten facilities at depths up to 13 meters due to its 700 lb payload as well as its velocity. [27] It could be fielded by 2012 with appropriate funding.

Inert Reentry Vehicle/Reentry Body

Scientists have studied the potential for removing the nuclear physics packages from Reentry Vehicles (RVs) and Reentry Bodies (RBs) carried by ICBMs and SLBMs. The addition of penetrative rods, GPS guided system, extensive range, responsiveness, and velocities in excess of 15000 ft/second give these potential weapons significant destructive power. However, the policy implications of utilizing these nuclear weapon designs are problematic. How does an adversary with adequate radar warning and nuclear response capability distinguish between an actual or inert warhead? As mentioned previously, though extremely accurate and capable of delivering impressive kinetic energy to a target, inert RV/RBs do not threaten deeper HDBTs due to rapid energy dissipation at the target surface.

Robust Nuclear Earth Penetrator

The Robust Nuclear Earth Penetrator (RNEP) is the only potentially new nuclear weapon specifically mentioned in the NPR implementor. It would be a marked improvement to the B61-11 penetrating weapon in that it would possess improved survivability against a wider range of soil or rock conditions, as well as an improved physics package designed for variable yields. It does not, however, have a planned precision capability. Current legislative prohibitions against

new weapon development or low yield studies would have to be lifted to take the RNEP beyond currently funded feasibility studies.[28] Political considerations as well as timelines necessary to field such a weapon would again be problematic. The B61-11 took over five years from conceptualization to fielding, and that effort entailed making a modest improvement to an existing bomb casing in order to increase its penetrative capability. [29]

NEW NUCLEAR WEAPONS

Does the United States need a new nuclear weapon to fit into the New Triad – beyond the RNEP feasibility study called for in the NPR and implementer? Specifically, should the United States develop a nuclear weapon that is precise, low yield, and can threaten deeply buried targets without the fall-out consequences of detonating a high yield weapon? If one listens to marginalists (those who desire to keep nuclear weapons fundamentally unfeasible both politically and militarily) and eliminationists (those who desire to eliminate nuclear weapons entirely), then the answer is a resounding "no."[30] Eliminationists view nuclear weapons as possibly leading to the end of the world, literally, at least in the case of a major nuclear exchange. Those not killed by prompt effects (radiation, blast, and thermal fires) would face freezing temperatures and starvation brought on by a "nuclear winter."[31] In their view, the only good nuclear weapon is one that does not exist. Others see development of "bunker-busting nuclear warheads" as a dangerous precedent producing few military advantages. Essentially, nuclear weapon development might undercut nonproliferation efforts due to perceived unfairness inherent with developing nuclear weapons that threaten enemy sanctuary, yet denying those (enemy states) the right to develop nuclear weapons themselves for self-protection. They also argue that conventional weapons, through improved intelligence, could effectively destroy these typically difficult to destroy facilities.[32] Furthermore, making nuclear weapons more feasible politically (e. g., reduced collateral damage) might lower the threshold for use, in effect blurring the line of distinction between conventional and nuclear weapons.[33]

Others feel that US national security would improve if "tactical" weapons are banned and dismantled entirely. In their view the United States should declare the sole purpose for nuclear weapons is to deter and respond to another country's first use of nuclear weapons. They also believe the United States should immediately ratify the CTBT. [34] Still others believe that the scientific logic behind building a precise, low yield, HDBT-killing weapon is flawed: precision can be easily fooled by enemy deception programs; low yield can be defeated by merely burying the facilities deeper; and one cannot sufficiently contain the fallout from a nuclear weapon, thereby lowering the COE to an acceptable level.[35]

On the other hand, there have been nuclear weapon advocates who have argued that a precise, low yield, earth-penetrating weapon (or at least a variant of it) is exactly what US security requires. A precision-guided 5-kiloton weapon could vaporize a 30-foot thick silo door; whereas current US weapons rely on higher yields to achieve the same effects with less precision. These "new" nuclear weapons would by their nature be simpler in design, easier to build and maintain, and would require a less robust infrastructure to support them. UGTs for new designs should not be ruled out. Designs taken off the shelf may not require resumption of underground testing, but the United States should be prepared to execute a test if required.[36]

Others have analyzed the utility of reduced collateral effects weapons. They recognize that current nuclear weapons with inertial guided systems require higher yields to achieve sufficient damage expectancies, thereby causing significant collateral damage. In essence, this might lead to what has been called self-deterrence on the part of the United States. This could, in turn, embolden enemies who believed they were safe from nuclear weapons and pursue dangerous courses of action.[37] For those who argue that conventional weapons, particularly new advanced conventional weapons, can effectively engage and destroy enemy deeply buried targets, there are others who have conducted research that demonstrate that nuclear weapons are still required for defeating extremely deep targets.[38] As mentioned previously, adversaries have learned from US ability to defeat surface and near surface bunkers. Target categories of leadership, Command and Control (C2), WMD production and storage, and critical infrastructure have been going underground. The concern is plausible that rogue leaders believe they can simply dig and provide sanctuary for themselves and their WMD capability. [39]

CONCLUSIONS

Is the New Triad congruent or divergent with US national and military strategy? Congruent if one confines the discourse to the ends described by recent strategic documents; divergent if one considers the lack of specific means to achieve the desired end state described in the NPR. There is insufficient evidence that the actions prescribed by the NPR implementer will result in sufficient nuclear and non-nuclear capabilities in the requisite timeframe (2012), particularly relating to the proliferation of HDBTs. Insufficient or slow development for advanced conventional capabilities endangers successful implementation of the New Triad. Is there then an exit strategy if this proves to be true? One would hope that the periodic assessments called for in the implementer would not only offer the opportunity to adjust or abandon the glide slope, but would also provide the political means to execute a new way forward.

Does the United States need a precision-guided, low yield, earth penetrating nuclear weapon? In light of the risks associated with advanced conventional weapons to fill the gaps or replace nuclear weapons, the answer is "yes." Since arguments against new weapons are reminiscent of shrill arguments in the past by those who renounce any nuclear weapons, it is difficult to empathize with their position. For example, when the United States withdrew from the 1972 Anti-ballistic Missile Treaty at the beginning of the Bush administration, many predicted dire consequences but none occurred.[40] Unfortunately, even if the United States fielded a new weapon that could credibly deny sanctuary provided by HDBTs, there is still an issue of actionable intelligence. Current categories of nuclear weapons and certain SOF actions can destroy all target categories, but at a political and military cost. If one desires to mitigate risk, one will need to identify, characterize accurately, and assess adequately the damage to any target with extremely high levels of fidelity for any sensitive target such as HDBTs. Any future advanced conventional weapon or precise low-yield nuclear weapon would still have limitations imposed by the mathematical probabilities of damage expectancy (DE) and circular error of probability (CEP). If precise target location or function is incorrect, even the best weapon systems may be rendered useless upon release.

Recognition of intelligence shortcomings, the threat of terrorism, and dangers posed by rogue countries possessing WMD is driving many current transformation initiatives, but transformation should not be limited to DoD or the intelligence community. Nuclear weapons have not changed since the end of the Cold War, yet there are no plans to significantly modify or replace any in the inventory. The stockpile numbers are shrinking, and the NPR's call for 1700-2200 operational warheads by FY2012 is recognition that the United States requires even fewer total numbers. It seems only prudent, however, that the leaders determine the size and makeup of the stockpile with regard to required nuclear capabilities in the hands of military commanders carrying out the national command authority's decisions. Likewise, in the face of increasing demand for fiscal resources and the zero sum game in budgetary allocations, it seems prudent to modify a small number of existing nuclear weapons, while moving others to an inactive or retired status. This would give the nation not only a required capability, but could contribute to a revitalized and restructured nuclear infrastructure.

Modification of nuclear weapons is not without inherent fiscal and legislative dangers. Problems with DOE's SSP are acknowledged and aggressively pursued by Congressional auditors.[41] Unless DOE and NNSA transforms and adjusts its fiscal management appropriately, new nuclear initiatives may be dead on arrival before they can be seriously considered. Though DoD cannot oversee this transformation or fiscal accountability, it can reestablish itself as the

chief driver and customer for NNSA nuclear programs. This includes supporting the Robust Nuclear Earth Penetrator (RNEP) and establishing clear requirements to move the RNEP beyond paper studies. There must also be more realism in the prospects of conventional advanced weapons capability to defeat HDBTs in order to make necessary programmatic and fiscal adjustments.[42]

The result will be a truly broad and comprehensive set of capabilities available to the President as called for in all current national and military security documents. Improving nuclear weapons through proven and readily available technologies mitigates the high risk associated with advanced conventional weapon research. Failure to achieve the NPR's end state may result in an inability for the United States to assure allies, and to dissuade and deter adversaries as stated in the QDR. Similarly, the United States may find itself hard pressed, if deterrence fails, to swiftly defeat a determined enemy. A dramatic statement perhaps, but can the country afford the risk?

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ENDNOTES

[1] Ashton B. Carter, John D. Steinbruner, and Charles A. Zraket, *Managing Nuclear Operations* (Washington D.C.: The Brookings Institute, 1987), 17.

[2] Richard A. Paulson, *The Role of US Nuclear Weapons in the Post-Cold War Era* (Maxwell Air Force Base: Air University Press, 1994), 11-15.

[3] Deputy Assistant to the Secretary of Defense (Nuclear Matters), *Nuclear Weapons Stockpile Management Handbook* (Washington, D.C.: Office of the Assistant to the Secretary of Defense for Nuclear Matters, June 2003), 188.

[4] Ibid, 187.

[5] This statement of the purpose of US nuclear forces remains unchanged from the 1996 version of JP 3-12. U.S. Joint Chiefs of Staff, *Doctrine for Nuclear Operations (Final Coordination)*, Joint Pub 3-12 (Washington, D.C.: U.S. Joint Chiefs of Staff, 3 September 2003), v.

[6] Though the extent to which NNSA nuclear facilities have deteriorated is classified, the auditing reports give an idea as to the scope of effort required to upgrade facilities. The cover memorandum for this report explicitly acknowledges deterioration of nuclear facilities since end of Cold War. U.S. Department of Energy, *Planning for National Nuclear Security Administration Infrastructure* , Audit Report OAS-B-03-02 (Washington, D.C.: Office of Audit Services, May 2003), 1-7.

[7] Though the NPR is a classified document, unclassified portions have been widely disseminated. GlobalSecurity.org, "Nuclear Posture Review [Excerpts] Submitted to Congress on 31 December 2001," 8 January 2002; available from <http:// www.globalsecurity.org/ wmd/library/ policy/dod/npr.htm>; Internet; accessed 13 September 2004.

[8] It is interesting to note that GAO has published repeated calls for DOE (and now NNSA) to establish accountability and program management procedures for its nuclear weapons programs. In response, DOE announces major reorganizations and initiatives, but nuclear experts within DoD see their efforts as sloppy at best. General Accounting Office, *Improved Management Needed to Implement Stockpile Stewardship Program Effectively*, (Washington, D.C.: U.S. General Accounting Office, December 2000), 7-14.

[9] Ibid.

[10] Donald H. Rumsfield, *Quadrennial Defense Review* (Washington, D.C.: Office of the Secretary of Defense, 30 September 2001), 14-16.

[11] George W. Bush, *National Security Strategy of the United States of America* (Washington, D.C.: The White House, September 2002), 13-16, 29-31.

[12] Donald H. Rumsfield, *Transformation Planning Guidance* (Washington, D.C.: Office of the Secretary of Defense, April 2003), 8, 11.

[13] STRATCOM was preparing to transform its capabilities to adaptively plan nuclear and non-nuclear strikes when UCP c/2 was published. It was the scope of the change that surprised

many within the nuclear community, as well as the requirement to become FOC in one year, or explain to the President what was necessary to become FOC. George W. Bush, "Change – 2 to Unified Command Plan 2002," memorandum for the Secretary of Defense (Washington, D.C.: The White House), 10 January 2003.

[14] Richard B. Myers, *National Military Strategy* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 2004), 11.

[15] Donald H. Rumsfield, *Strategic Deterrence Joint Operating Concept (Final Draft)* (Washington, D.C.: Office of the Secretary of Defense, February 2004), 32-34.

[16] While this cannot be attributed directly to a published source, attendance at several Nuclear Weapons Council meetings by the author and representatives of his respective offices sustain the fact that the principal delay to publication of the NPR implementer was disagreement between the offices in question – AT&L and Policy.

[17]GlobalSecurity.org.

[18] The NPR Implementor is also a classified document. Only unclassified portions have been paraphrased in this work. Undersecretary of Defense (Policy), *The NPR Implementer,* (Washington, D.C.: Office of the Secretary of Defense, March 2003), 2-25.

[19] Ibid.

[20] Lowell E. Jacoby, "Current and Projected National Security Threats to the United States," statement for the record for the Senate Armed Services Committee, 26 February 2004.

[21] Robert Hastie, "Hard Target Defeat Weapons and Weaponeering," briefing slides, Fort Belvoir, Defense Threat Reduction Agency, 22 September 2004.

[22] Dr. Linger is among many distinguished nuclear experts who have been looking at the difficulties of defeating/destroying HDBTs with both nuclear and non-nuclear options. Donald Linger, "Nuclear and Non-nuclear Options for Hard Target Defeat Incorporating Hypersonics and High Performance Computing," briefing slides, Fort Belvoir, Defense Threat Reduction Agency, 2 July 2004.

[23] Hastie.

[24] Ibid.

[25] Ibid.

[26] Ibid.

[27] GlobalSecurity.org, "HyStrike – High Speed Strike Missile," available from <http://www.globalsecurity.org/military/systems/munitions/hystrike.htm>; Internet; accessed 2 December 2004.

[28] Jonathan Medalia, *Nuclear Weapon Initiatives*: Low-Yield R&D, Advanced Concepts, Earth Penetrators, Test Readiness (Washington D.C.: Congressional Research Service, 28 October 2003), 57.

[29] Adam Stump, "B-2 Successfully Drops Improved Bunker Buster Bomb, 26 March 1998; available from <http://www.fas.org/nuke/guide/usa/bomber/n19980326_980417.html>; accessed on 2 December 2004.

[30] Freedman introduces the 'marginalist' and 'eliminationist' terms. The anti-nuclear discourse is widely understood within the community. Lawrence Freedman, *The Evolution of Nuclear Strategy*, 3rd ed. (New York: Palgrave MacMillan, 2003), 424-426.

[31] The nuclear winter scenario has been criticized by the scientific community after 20 years. The in-going assumptions for calculations: thousands of megatons detonated, all ground bursts, etc, were suspect. In the early 90's, Mt Pinatubo released comparative amounts of dust in the upper atmosphere with negligible effects to the climate. Mark A. Harwell, *Nuclear Winter* (New York: Springer-Verlag, 1984), 161-163.

[32] Michael A. Levi, "The Case against New Nuclear Weapons," *Issues in Science and Technology* 19 (Spring 2003): 63 [database on-line]; available from ProQuest; accessed on 21 September 2004.

[33] Martin Butcher, *What Wrongs Our Arms May Do: The Role of Nuclear Weapons in Counterproliferation* (Washington, D.C.: Physicians for Social Responsibility, 2003), 64.

[34] Union of Concerned Scientists, "Nuclear Posture Review Backgrounder," UCSUSA Online [journal on-line]; available from <http://www.ucsusa.org/global_security/nuclear_weapons/page.cfm?pageID=623>; Internet; accessed 13 September 2004.

[35] Andrew Koch, "The Bunker Nightmare Goes Nuclear," *Popular Science*, October 2002, 83.

[36] Stephen M. Younger, *Nuclear Weapons in the Twenty-First Century*, Los Alamos Unclassified Report LAUR-00-2850 (Los Alamos: Los Alamos National Laboratory, 27 June 2000), 3, 9-10.

[37] Bryan L. Fearey, et al., "An Analysis of Reduced Collateral Damage Nuclear Weapons," *Comparative Strategy*, no. 22 (2003): 312.

[38] Linger.

[39] Keith B. Payne, "The Nuclear Jitters," *National Review*, 30 June 2003, 3.

[40] Ibid.

[41] General Accounting Office.

[42] Jonathan Medalia, "Robust Nuclear Earth Penetrator Budget Request and Plan, FY2005-FY2009," 8 March 2004; available from <http://64.177.207.201/pages/16_559.html>; Internet; accessed 6 June 2004.

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